

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

FUNKE *et al*

Appl. No.: 10/581,346

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For: **Active Compound Combinations
Having Insecticidal Properties**

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I, Wolfram Andersch of 51469 Bergisch Gladbach, Schlodderdicher Weg 77, a
citizen of Germany, hereby declare:

1. that I received the doctor's degree in biology from the University of
Göttingen, in 1983, Germany;
2. that I am now an employee of Bayer CropScience AG in Germany as a
biologist;
3. that I have specialized in the field of plant protection; and
4. that the following tests have been carried out under my supervision and
control.
5. The expected efficacy of a given combination of two compounds is
calculated as follows (see Colby, S.R., "Calculating Synergistic and Antagonistic
Responses of Herbicide Combinations," Weeds 15, pp. 20-22, 1967):

If

- X is the efficacy expressed in % mortality of the untreated control for test compound A at a concentration of m ppm respectively m g/ha,
Y is the efficacy expressed in % mortality of the untreated control for test compound B at a concentration of n ppm respectively n g/ha,
E is the efficacy expressed in % mortality of the untreated control using the mixture of A and B at m and n ppm respectively m and n g/ha,

$$E = X + Y - \frac{X \cdot Y}{100}$$

6. If the observed insecticidal efficacy of the combination is higher than the one calculated as "E," then the combination of the two compounds is more than additive, *i.e.*, there is a synergistic effect.

Example A

7. *Myzus persicae* - test

- Solvent: 78 parts by weight of acetone
1.5 parts by weight of dimethylformamide
Emulsifier: 0.5 parts by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration. Cabbage leaves (*Brassica oleracea*) which are heavily infested by the green peach aphid (*Myzus persicae*) are treated by being sprayed with the preparation of the active compound at the desired concentration. After the specified period of time, the mortality in % is determined. 100 % means that all the aphids have been killed; and 0 % means that none of the aphids have been killed. In this test, for example, the following combinations according to the invention demonstrate synergistic effects as shown in Tables A1 and A2.

Table A1
***Myzus persicae* - Test**

<u>Active Ingredient</u>	<u>Concentration in g/ha</u>	<u>Efficacy in % after 1 day</u>
I-1-S2	4	0
	0.8	0
I-1-1	0.8	0
Acephate	4	0
Carbaryl	20	0
Methamidophos	4	20
I-1-S2 + Acephate (1 : 5) according to the invention	0.8 + 4	obs.* 30
I-1-1 + Acephate (1 : 5) according to the invention	0.8 + 4	cal.** 0
I-1-S2 + Carbaryl (1 : 5) according to the invention	4 + 20	obs.* 20
I-1-1 + Methamidophos (1 : 5) according to the invention	0.8 + 4	cal.** 20

* obs. = observed insecticidal efficacy

** cal. = efficacy calculated with Colby-formula

Table A2
***Myzus persicae* - Test**

<u>Active Ingredient</u>	<u>Concentration in g/ha</u>	<u>Efficacy in % after 6 days</u>
I-1-54	0.8	0
I-1-52	0.8	70
I-1-1	0.8	40
I-1-24	4	10
	0.8	0
I-1-12	0.8	40
I-1-4	0.8	0
Acephate	4	0
Carbaryl	4	0
Chlorpyrifos	4	80
Methamidophos	4	10
Thiodicarb	20	30
	4	0
I-1-12 + Acephate (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 60 40
I-1-1 + Carbaryl (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 70 40
I-1-54 + Chlorpyrifos (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 100 80
I-1-24 + Chlorpyrifos (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 100 80
I-1-4 + Chlorpyrifos (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 100 80
I-1-52 + Methamidophos (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 90 73
I-1-24 + Thiodicarb (1 : 5) according to the invention	4 + 20	obs.* cal.** 60 37
I-1-12 + Thiodicarb (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 80 40

* obs. = observed insecticidal efficacy

** cal. = efficacy calculated with Colby-formula

Example B

8. ***Phaedon cochleariae* - test**

Solvent: 78 parts by weight of acetone

1.5 parts by weight of dimethylformamide

Emulsifier: 0.5 parts by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration. Cabbage leaves (*Brassica oleracea*) are treated by being sprayed into the preparation of the active compound of the desired concentration and are infested with larvae of the mustard beetle (*Phaedon cochleariae*) as long as the leaves are still moist. After the specified period of time, the mortality in % is determined. 100 % means that all the beetle larvae have been killed; 0 % means that none of the beetle larvae have been killed. In this test, for example, the following combinations according to the invention demonstrate synergistic effects as shown in Table B1.

Table B1
***Phaedon cochleariae* – test**

<u>Active Ingredient</u>	<u>Concentration in g/ha</u>	<u>Efficacy in % after 6 days</u>
I-1-52	0.16	50
I-1-1	0.8	67
I-1-24	4	67
I-1-4	4 0.8	83 0
Acephate	4 0.8	0 0
Carbaryl	20 4	0 0
Methamidophos	4	0
Thiodicarb	20	0
I-1-52 + Acephate (1 : 5) according to the invention	0.16 + 0.8	obs.* cal.** 67 50
I-1-1 + Acephate (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 100 67
I-1-4 + Acephate (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 17 0
I-1-24 + Carbaryl (1 : 5) according to the invention	4 + 20	obs.* cal.** 83 67
I-1-4 + Carbaryl (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 33 0
I-1-4 + Methamidophos (1 : 5) according to the invention	0.8 + 4	obs.* cal.** 33 0
I-1-24 + Thiodicarb (1 : 5) according to the invention	4 + 20	obs.* cal.** 83 67
I-1-4 + Thiodicarb (1 : 5) according to the invention	4 + 20	obs.* cal.** 100 83

*obs. = observed insecticidal efficacy

** cal. = efficacy calculated with Colby-formula

Example C

9. *Spodoptera frugiperda* - test

Solvent: 78 parts by weight of acetone
 1.5 parts by weight of dimethylformamide
Emulsifier: 0.5 parts by weight of alkylaryl polyglycol ether

To produce a suitable preparation of active compound, 1 part by weight of active compound is mixed with the stated amount of solvent and emulsifier, and the concentrate is diluted with emulsifier-containing water to the desired concentration. Cabbage leaves (*Brassica oleracea*) are treated by being sprayed into the preparation of the active compound of the desired concentration and are infested with larvae of the fall army worm (*Spodoptera frugiperda*) as long as the leaves are still moist. After the specified period of time, the mortality in % is determined. 100 % means that all the caterpillars have been killed; 0 % means that none of the caterpillars have been killed. In this test, for example, the following combinations according to the invention demonstrate synergistic effects as shown in Tables C1 and C2.

Table C1
***Spodoptera frugiperda* – test**

<u>Active Ingredient</u>	<u>Concentration in g/ha</u>	<u>Efficacy in % after 2 days</u>
I-1-54	0.8	67
	0.16	17
I-1-24	0.8	83
	0.16	50
Acephate	4	0
	0.8	0
Carbaryl	4	0
	0.8	0
I-1-54 + Acephate (1 : 5) according to the invention	0.8 + 4	obs.* 100 cal.** 67
I-1-4 + Acephate (1 : 5) according to the invention	0.16 + 0.8	obs.* 67 cal.** 50
I-1-54 + Carbaryl (1 : 5) according to the invention	0.8 + 4	obs.* 100 cal.** 67
I-1-24+ Carbaryl (1 : 5) according to the invention	0.8 + 4	obs.* 100 cal.** 83
I-1-54 + Chlorpyrifos (1 : 5) according to the invention	0.16 + 0.8	obs.* 50 cal.** 17

*obs. = observed insecticidal efficacy

** cal. = efficacy calculated with Colby-formula

Table C2
***Spodoptera frugiperda* – test**

<u>Active Ingredient</u>	<u>Concentration in g/ha</u>	<u>Efficacy in % after 6 days</u>
I-1-54	0.16	67
I-1-52	0.16	50
I-1-24	0.032	0
I-1-12	0.032	0
I-1-4	0.032	17
Acephate	0.8	0
Chlorpyrifos	0.8 0.16	0 0
Methamidophos	0.8 0.16	0 0
Thiodicarb	0.8	0
I-1-52 + Acephate (1 : 5) according to the invention	0.16 + 0.8	obs.* cal.** 83 50
I-1-54 + Chlorpyrifos (1 : 5) according to the invention	0.16 + 0.8	obs.* cal.** 100 67
I-1-24 + Chlorpyrifos (1 : 5) according to the invention	0.032 + 0.16	obs.* cal.** 33 0
I-1-12 + Chlorpyrifos (1 : 5) according to the invention	0.032 + 0.16	obs.* cal.** 33 0
I-1-4 + Chlorpyrifos (1 : 5) according to the invention	0.032 + 0.16	obs.* cal.** 33 17
I-1-52 + Methamidophos (1 : 5) according to the invention	0.16 + 0.8	obs.* cal.** 67 50
I-1-24 + Methamidophos (1 : 5) according to the invention	0.032 + 0.16	obs.* cal.** 17 0
I-1-12 + Methamidophos (1 : 5) according to the invention	0.032 + 0.16	obs.* cal.** 67 0
I-1-54 + Thiodicarb (1 : 5) according to the invention	0.16 + 0.8	obs.* cal.** 100 67

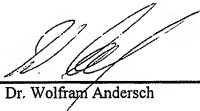
*obs. = observed insecticidal efficacy

** cal. = efficacy calculated with Colby-formula

The undersigned declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signed at Monheim, Germany,

29 2009
Date


Dr. Wolfram Andersch